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Roads Analysis Report

Nebraska National Forest and Associated Units

January 13, 2003

Introduction

In August 1999, the Washington Office of the USDA Forest Service published Miscellaneous Report FS-643 *Roads Analysis: Informing Decisions about Managing the National Forest Transportation System*. The objective of roads analysis is to provide decision-makers with critical information to develop road systems that are safe and responsive to public needs and desires, are affordable and efficiently managed, have minimal negative ecological effects on the land, and are in balance with available funding for needed management actions.

In October 1999, the agency published Interim Directive 7710-99-1 authorizing units to use, as appropriate, the road analysis procedure embodied in FS-643 to assist land managers making major road management decisions. The Rocky Mountain Region of the Forest Service then published a roads analysis guidance document as a supplement to Appendix 1 of FS-643. This document provides guidance concerning the appropriate scale for addressing the roads analysis.

On March 3, 2000, the Forest Service proposed to revise 36 CFR Part 212 to shift emphasis from transportation development to managing administrative and public access within the capability of the lands. The proposal was to shift the focus of National Forest System road management from development and construction of new roads to maintaining and restoring needed roads and decommissioning unneeded roads within the context of maintaining, managing, and restoring healthy ecosystems.

On January 12, 2001, the Forest Service issued the final National Forest System Road Management Rule. This rule revises regulations concerning the management, use, and maintenance of the National Forest Transportation System. Consistent with changes in public demands and use of National Forest System resources and the need to better manage funds available for road construction, reconstruction, maintenance, and decommissioning, the final rule removes the emphasis on transportation development and adds a requirement for science-based transportation analysis. The final rule is intended to help ensure that additions to the National Forest System road network are those deemed essential for resource management and use; that construction, reconstruction, and maintenance of roads minimize adverse environmental impacts; and that unneeded roads are decommissioned and restoration of ecological processes are initiated.

Roads analysis is a six-step process. The steps are designed to be sequential with the understanding the process may require feedback and iteration among steps over time as an analysis matures. The amount of time and effort spent on each step differs by project based on specific situations and available information. The process provides a set of possible issues and analysis questions for which the answers can help managers make choices about road system management. Decision-makers and analysts determine the relevance of each question, incorporating public participation as deemed necessary. The following six steps guided the process.

- Step 1. Setting up the analysis
- Step 2. Identifying the issues

- Step 3. Describing the situation
- Step 4. Assessing benefits, problems and risks
- Step 5. Describing opportunities and setting priorities
- Step 6. Reporting

A. Setting Up the Analysis

Objectives of the Analysis

The roads analysis project will be used to provide information and a framework in the support of District level travel management needs and issues. It is intended to identify the minimum road system needed for safe and efficient travel and for administration, utilization, and protection of National Forest System lands. It will also be used to identify roads on lands under Forest Service jurisdiction that are no longer needed to meet forest resource management objectives and that, therefore, should be considered for decommissioning or for other uses such as for trails.

Identify Scale/Analysis Area

- Be at the forest scale for the Nebraska National Forest and Associated units in South Dakota and Nebraska
- Concentrate on maintenance level 3, 4, and 5 roads
- Use only available and existing data
- Be spatial or Geographic Information System (GIS) based whenever possible
- Use information and data that is consistent with that used in the Nebraska National Forest plan revision effort and can be applied consistently across the Forest

Interdisciplinary Team Members and Participants

The Core Interdisciplinary Team and their specialties:

Bob Sprentall, Team Leader	Planning Staff	Supervisor's Office
Pat Irwin	District Ranger	Pine Ridge Ranger District
Jerry Schumacher	Public Affairs	Supervisor's Office
Terry Dilts	Recreation/Lands	Supervisor's Office
Servero Coslyeon	Engineering	Supervisor's Office

Extended team members and their specialties:

Kim Earney	Engineering	Supervisor's Office
Greg Schenbeck	Wildlife	Supervisor's Office
Virginia Emly	GIS Coordinator	Supervisor's Office
Kevin Heikkila	Realty Spec.	Supervisor's Office
Marsha Yates	Conv. Examiner	Supervisor's Office

Alan Setzer
Keri Hicks
Barb Beasley

Fire Mgt. Officer
Archeologist
Paleontologist

Supervisor's Office
Supervisor's Office
Supervisor's Office

Analysis Plan

The main analysis process considered all 1,316.14 miles of maintenance level 3, 4, and 5 roads in the Forest roads database. It was a two-step, integrated approach that considered issues, data, and information and systematically addressed all maintenance level 3, 4, and 5 roads in a single analysis.

Step 1 considered the following:

- **Development of Issues.** The Interdisciplinary Team identified issues based on the document "Road Analysis: Informing Decisions About Managing the National Forest Transportation System" Miscellaneous Report FS-643, 1999. The issues were further refined in the development of the Nebraska National Forest Roads Analysis Task Sheet (Appendix F).
- **Road Location** (miles of roads)
- **Human Use Values**
- **Aquatic Risks**
- **Wildlife Risks**

Once the roads and issues were identified the core team established these as elements. These elements were grouped into 3 modules for analysis based on similarities. The core team and extended team rated each road on criteria developed for the elements in each of the three modules: Human Use Values, Aquatic Risks, and Wildlife Risks. The teams then developed a "High", "Moderate", or "Low" rating for each road for each module. These are identified in Appendices A, B, and C.

Step 2

The core team and extended teams then grouped the module ratings into a single recommended management action alternative for each road (Appendix D). The management action options ranged from major improvements to some form of decommissioning.

The core team and extended teams conducted resource specific analysis to derive the data that appears in the module matrices and recommended management action matrix.

B. Identifying Issues

Issues were generated from the document "Road Analysis: Informing Decisions About Managing the National Forest Transportation System" Miscellaneous Report FS-643,

1999 and the R2 Supplemental FS-643 (Appendix E). The issues were further refined in the development of the Nebraska National Forest Roads Analysis Task Sheet (Appendix F). Also, public comments received on the Draft and Final Environmental Assessment and Land and Resource Management Plans for the Northern Great Plains Management Plans Revision Process were considered in comparing to the issues generated from the FS-643 documents.

C. Describing the Situation

The area addressed in this roads analysis is not a contiguous land unit. The Nebraska National Forest and Associated Units are located in Nebraska and South Dakota. The Forest is divided into two national forest units and three grassland units. The analysis is described District. This analysis focuses on maintenance level 3, 4, and 5 roads within the Nebraska National Forest and Associated units.

Bessey Ranger District

The Bessey Ranger District, which includes two units--the Bessey Unit of central Nebraska, and the Samuel R. McKelvie National Forest of north central Nebraska, is located in the sandhills of Nebraska, the largest grass-stabilized dune region in the Western Hemisphere. The Bessey Ranger District encompasses about 205,520 acres. The district office is located near Halsey, Nebraska along with the Charles E. Bessey Tree Nursery. Portions of the Bessey Ranger District include plantation stands of ponderosa pine and eastern redcedar. The 22,000 acres of hand-planted forests are distinguished as the largest plantation forest in United States. Two geographic areas are included for the Bessey Ranger District:

Bessey Unit Geographic Area

The Bessey Geographic Area encompasses about 90,405 acres of National Forest System lands in central Nebraska's 12 million acre sandhills region. The Bessey Ranger District, Halsey, Nebraska, administers this geographic area.

The climate of the Bessey Geographic Area can be classified as semi-arid Continental. In general, the weather of the sandhills is highly variable. Precipitation arrives mostly from the Gulf of Mexico, with 75 percent of it falling between April and September. Precipitation varies widely, from around 17 inches to 23 inches per year. Summer temperatures average from the 60s to the mid-70 degrees Fahrenheit, while average winter temperatures are near freezing at 32-degrees Fahrenheit. Still, summer temperatures can rise well above 100 degrees, while winter temperatures can fall below zero degrees. Spring blizzards are common. The wind tends to blow frequently.

The topography of the area is characterized by large vegetated sand masses created by blowing sand as recently as 1500 years ago. A number of dune types are found in the sandhills. In the Bessey Geographic Area, dune types include crescentic-ridge and linear

dune types. Dunes in the Nebraska sandhills can raise to more than 400 feet, can be as long as 20 miles, and can display slopes as steep as 25 percent. Elevation in the Bessey Geographic Area ranges from around 2,225 to 2,700 feet above sea level.

The rivers and streams of the Nebraska sandhills are unusual in several respects. Sandhills rivers have few tributaries. They seldom flood, despite low banks, and because the flow is derived from steady groundwater seepage, they flow at a nearly constant rate. Nearly all sandhills rivers rise within the sandhills. The Niobrara River, which begins in eastern Wyoming, being the one exception. Sandhills rivers are relatively low in dissolved solids, but do contain silica. Two important rivers are associated with the Bessey Geographic Area. The Middle Loup River lies just touches the northern boundary, while the Dismal River intermittently breaches the southern boundary.

Also of note is the High Plains Aquifer, which lies beneath the sandhills. Within the Bessey Geographic Area, this aquifer has a saturated thickness of more than 500 feet.

The dominant vegetation consists of several sandhills communities. They include 1) bunchgrass communities of little bluestem, junegrass, needleandthread, prairie sandreed and switchgrass, 2) sand muhly communities of sand muhly, sand bluestem, needleandthread, prairie sandreed and hairy grama, 3) blowout communities of blowout grass, prairie sandreed, sand muhly, ricegrass, sand lovegrass and the endangered species blowout penstemon. The Bessey Geographic Area also has a limited floodplain prairie and hardwood forest community. In addition, hand-planted plantation stands of jack pine, Austrian pine, Scotch pine, ponderosa pine and Eastern redcedar are found in this geographic area.

Primary access to the Bessey Unit is by State Highway 2. Access onto the unit is via State Highway 86B and the Gaston Road (FS259). The Circle Road (FS203) and the South Natick Road (F212) are the major routes through the Bessey Unit.

Samuel R. McKelvie National Forest Geographic Area

The McKelvie Geographic Area encompasses about 115,115 acres of National Forest System lands in the north central portion of Nebraska's 12 million acre sandhills region. The Bessey Ranger District headquartered near Halsey, Nebraska administers this geographic area.

The climate of the McKelvie Geographic Area can be classified as semi-arid Continental. In general, the weather of the sandhills is highly variable. Precipitation arrives mostly from the Gulf of Mexico, with 75 percent of it falling between April and September. Precipitation varies widely, from around 17 inches to 23 inches per year. Summer temperatures average from the 60s to the mid-70 degrees Fahrenheit, while average winter temperatures are near freezing at 32-degrees Fahrenheit. Still, summer temperatures can rise well above 100 degrees, while winter temperatures can fall below zero degrees. Spring blizzards are common. The wind tends to blow frequently.

The topography of the area is characterized by large vegetated sand masses created by blowing sand as recently as 1500 years ago. A number of dune types are found in the sandhills. In the McKelvie Geographic Area, dune types include the crescentic-ridge, the moderate-relief sand sheet, the wide-spaced crescentic and the linear dune types. Dunes in the Nebraska sandhills can raise to more than 400 feet, can be as long as 20 miles and can display slopes as steep as 25 percent. Elevation in the McKelvie Geographic Area ranges from around 2,625 to 3,175 feet above sea level.

The rivers and streams of the Nebraska sandhills are unusual in several respects. Sandhills rivers have few tributaries. They seldom flood, despite low banks, and primarily because the flow is derived almost exclusively from steady groundwater seepage, they flow at a nearly constant rate. Nearly all sandhills rivers rise within the sandhills. The Niobrara River, which begins in eastern Wyoming, is the only exception. Sandhills rivers are relatively low in dissolved solids, but do contain silica. Two rivers of importance are associated with the McKelvie Geographic Area. The Niobrara River touches or crosses the northern boundary, while the Snake River touches the southern boundary. In addition, Merritt Reservoir, on the Snake River, lies adjacent to the McKelvie Geographic Area on the southeastern corner. A portion of the reservoir lies within the boundary of the forest and is managed through agreements with the Bureau of Reclamation and Nebraska Game and Parks Commission.

Also of note is the High Plains Aquifer, which lies beneath the sandhills. Within the McKelvie Geographic Area, this aquifer has a saturated thickness of more than 500 feet. The High Plains Aquifer feeds numerous wetlands and marshes.

The dominant vegetation consists of several sandhills plant communities. They include 1) bunchgrass communities of little bluestem, junegrass, needleandthread, prairie sandreed and switchgrass, 2) sand muhly communities of sand muhly, sand bluestem, needleandthread, prairie sandreed and hairy grama, 3) blowout communities of blowout grass, prairie sandreed, sand muhly, ricegrass, sand lovegrass and the blowout penstemon, a state and federally listed endangered species. In addition, approximately 2200 acres of the geographic area consists of hand-planted ponderosa pine stands.

Primary access to the Samuel R. McKelvie National Forest is State Highway 16F going south from Nenzel, Nebraska. Also, access via Forest Highway 5 from Merritt Dam going west from State Highway 97 south and west from Valentine, Nebraska.

Buffalo Gap National Grassland: Fall River Ranger District

The Fall River Ranger District encompasses about 322,000 acres of the 595,000-acre Buffalo Gap National Grassland of southwestern South Dakota. The district constitutes the western and southern reaches of the national grassland. It extends from the Cheyenne River on the east to the Wyoming and Nebraska borders on the west and south, respectively. The district office is located in Hot Springs, South Dakota.

The Fall River Ranger District is divided into three distinct geographic areas:

Fall River Northeast Geographic Area

The Fall River Northeast Geographic Area includes about 91,908 acres of National Forest System lands on the northeastern portion of the Fall River Ranger District. The Wall Ranger District of the Buffalo Gap National Grassland borders this area on the east. The climate of the Fall River Northeast Geographic Area can be classified as semi-arid Continental. Local weather can be highly variable and unpredictable. Temperatures can range from -40 degrees below zero Fahrenheit in the winter to more than 110-degrees Fahrenheit in the summer. Precipitation levels average a little above 16 inches per year with the majority falling as rain from about May through July.

The topography of this area is a blend of rolling hills and plains, rugged badlands formations, and Cheyenne River breaks. The major distinguishing landmarks and features include, from north to south, Rapid Creek, Railroad Buttes, Red Shirt Canyon and the Chalk Hills. Drainages flow primarily to the east into the Cheyenne River, which forms the eastern boundary of the Fall River Ranger District and is a significant feature in this geographic area. Elevations range from about 2,450 feet above sea level in the northwestern corner of the district along the Cheyenne River to 3,100 feet above sea level in the Red Shirt Canyon area.

The primary tributaries of the Cheyenne River in this geographic area include, from north to south, Rapid Creek, Spring Creek, Battle Creek and French Creek. All of these streams originate in the interior of the Black Hills more than 50 miles from their confluence with the Cheyenne River.

The dominant vegetation types include: western wheatgrass in the uplands with green ash, American elm, snowberry, and chokecherry, in the draws. Cottonwood trees are common along the Cheyenne River, but also appear, to a lesser extent, along the major tributary streams. Rocky Mountain juniper also provides a significant woody component on many of the north-facing slopes.

Currently, there are two developed recreation facilities in this geographic area. They are the Railroad Buttes OHV Area and French Creek Campground. The primary dispersed recreational opportunities within this geographic area include big game hunting, upland game hunting, waterfowl hunting, wildlife viewing, rockhounding, mountain biking, hiking, fishing, and camping.

Primary access to this geographic area is via State Highway 44 on the north side and State Highway 79 on the west side. Access into this area is primarily via County Roads 220 and 459 on the north and County Roads 18 and 719 on the west.

Fall River Southeast Geographic Area

The Fall River Southeast Geographic Area encompasses about 111,621 acres of National Forest System lands on the central portion of Fall River Ranger District. The Pine Ridge Sioux Indian Reservation borders this area on the east.

The climate of the Fall River Southeast Geographic Area can be classified as semi-arid Continental. Local weather can be highly variable and unpredictable. Temperatures can range from –40 degrees below zero Fahrenheit in the winter to more than 110-degrees Fahrenheit in the summer. Precipitation levels average around 16 inches per year with the majority falling as rain from about May through July.

The topography of this area is a blend of gently rolling hills and semi-flat plains. Distinguishing features include, from north to south, the Jim Wilson and First Black Canyons, Limestone Butte and Lone Butte. Drainages generally flow to the west into the Cheyenne River or southeast into the White River. Elevations range from about 2,900 feet above sea level along the Cheyenne River in the northern portion of this geographic area to about 3,530 feet above sea level atop Limestone Butte in the central portion of this geographic area.

The primary tributaries flowing into the Cheyenne River are Horsehead Creek and Hay Canyon Creek and the primary tributary flowing into White River is Blacktail Creek. Dominant vegetation includes western wheatgrass in the uplands and some chokecherry, snowberry, green ash, willow, and cottonwood in the draws.

Currently, the only developed recreational facility within this geographic area is the Pioneer Picnic Area. The primary dispersed recreational opportunities within this geographic area include big game hunting, upland game hunting, waterfowl hunting, wildlife viewing, rockhounding, mountain biking, hiking, fishing, and camping.

Primary access to this geographic area is off of US Highway 385 and 18. Major access into this unit is via County Road 1 (Smithwick Road) and County Road 3 (White-Goodnick Road).

Fall River West Geographic Area

The Fall River West Geographic Area encompasses about 119,749 acres of National Forest System lands on the southwestern portion of the Fall River Ranger District. The Oglala National Grassland borders this area on the south.

The climate of the Fall River West Geographic Area can be classified as semi-arid Continental. Local weather can be highly variable and unpredictable. Temperatures can range from in excess of 40-degrees below zero Fahrenheit in the winter to more than 110-degrees above zero Fahrenheit in the summer. Precipitation levels average around 14 to 15 inches per year with the majority falling as rain from about May through July.

The topography of this geographic area is a blend of rolling hills, plateaus, and flat bottomlands that drain into the Cheyenne River and its' tributaries. Soils are generally thin. The southern portion of this area includes exposed clays and hardpan.

Distinguishing features include, from north to south, the Cheyenne River and the former Black Hills Army Ordnance Depot. Drainages generally flow north into the Cheyenne

River. Elevations range from about 3,600 feet above sea level along the northern stretches of the Cheyenne River in this geographic area to about 4,200 feet above sea level south of the former Black Hills Army Ordnance Depot - the highest point on the Fall River Ranger District.

Primary tributaries flowing into the Cheyenne River in this geographic area include, from north to south: Moss Agate Creek, Dry Creek, Fiddle Creek, Cottonwood Creek, Coal Creek, Alkali Creek, Indian Creek and Hat Creek.

The dominant vegetation includes western wheatgrass in the uplands, with scattered cottonwood and chokecherry communities. A few ponderosa pine can be found along the escarpment of Fiddle Creek.

A significant sagebrush community lies north of the Black Hills Army Ordnance Depot. Scattered greasewood communities can be found along creek bottoms throughout the geographic area.

Currently, there are no developed recreational facilities within this geographic area. The primary dispersed recreational opportunities within this geographic area include big game hunting, upland game hunting, waterfowl hunting, wildlife viewing, mountain biking, hiking, fishing, and camping.

Primary access to this geographic area is via County Road 5 (Ardmore Road) on the south end and US Highway 18 on the north end. Major routes through the area are County Road 8 (FS7005) that goes through the northern portion and road FS7009 (Alkali Road) that goes through the southern portion.

Buffalo Gap National Grassland: Wall Ranger District

The Wall Ranger District encompasses about 273,000 acres of the 595,000-acre Buffalo Gap National Grassland of southwestern South Dakota. The district constitutes the northern and eastern reaches of the national grassland. It extends east from the Cheyenne River through the White River Badlands, wrapping around Badlands National Park, to just south of Kadoka, South Dakota. The Wall Ranger District also shares common boundary with the Pine Ridge Indian Reservation and the Fall River Ranger District of the Buffalo Gap National Grassland. The district office is located in Wall, South Dakota, and is adjacent to the National Grassland Visitors Center, the only Forest Service visitor center in the country devoted entirely to interpreting the country's 20 national grasslands.

The Wall Ranger District is divided into three distinct geographic areas:

Wall North Geographic Area

The Wall North Geographic Area includes approximately 69,600 acres of National Forest System lands in the northern portions of the Wall Ranger District.

The climate of the Wall North Geographic Area can be classified as semi-arid Continental. Local weather can be highly variable and unpredictable. Temperatures can range from minus 20 degrees below zero Fahrenheit in the winter to more than 100 degrees Fahrenheit in the summer. Precipitation levels average 16.5 inches per year with the majority falling as rain from about April to July.

The topography of the area consists of typical rolling grasslands, above the "Wall" badlands landscape feature. The "Wall" is more than 40 miles in length, beginning near Wall, South Dakota, and tapering out south of Kadoka. This landscape features drops vertically an average of about 600 feet. The major distinguishing landmarks and features include the Upper Bad River Drainage to the northeast, and the Wall, which typically provides the southern boundary. Drainages flow primarily to the north and east into the Cheyenne River and Bad River. Elevations range from approximately 2,400 feet above sea level at the east end of the geographic area to 3,300 feet near the Pinnacles Ranger Station at Badlands National Park.

Upland grassland is the primary vegetation/habitat type covering about 92% of the geographic area. The soils are the most productive in the geographic area, providing a range of forage production annually from 1,200 to 2,200 pounds per acre. Over 55 percent of this upland grassland habitat consists of highly productive range sites and nearly 20 percent are minimally productive range sites. Mid grasses and a variety of forbs dominate the native vegetation. This mixed grass prairie is made up of cool-season and warm-season plants that provide diverse habitat for a variety of wildlife species and forage for livestock. The principle grass species are western wheatgrass, green needlegrass, needleandthread, sideoats grama, blue grama, buffalograss, little bluestem, and big bluestem.

The balance of the geographic area is comprised of a variety of vegetation/habitat types: Badlands (1%) are barren, highly eroded lands with little or no vegetation. Badlands provide unique habitat for some plants and animals that are suited to open, barren soils. Juniper breaks (2%) are a unique habitat type that occurs primarily along the Cheyenne River. These areas have moderate to dense cover of juniper with an understory of sideoats grama and little bluestem. This habitat type provides critical hiding cover and thermal cover for a number of wildlife species. Prairie dog colonies (2%) are a unique component of upland grasslands and provide habitat for a number of TES species. Prairie dog colonies are fairly small and scattered across this geographic area. Although the woody draw/riparian woodland habitat (1%) comprises a very small portion of the geographic area, this habitat type is critical for many wildlife species. The woody draw/riparian woodlands provide the highest diversity of both plant and animal life in the geographic area. Principle woody species include green ash, chokecherry, buffaloberry, snowberry, cottonwood, and willow. Primary creeks and drainages include Little Buffalo Creek, the South Fork of the Bad River, Whitewater Creek, Crooked Creek, Sage Creek, Big Buffalo Creek and Cottonwood Creek. Wetland/aquatic habitats are unusual in this geographic area (1%) and the majority are constructed water impoundments that have improved waterfowl production. A number of these impoundments have been developed into warm-water fisheries and provide additional recreational experiences. The sagebrush

habitat type (<1%) is very limited and found along several of the major floodplain areas scattered throughout this geographic area.

Currently, the only developed recreational facility within this geographic area is the National Grasslands Visitor Center. The primary dispersed recreational opportunities within this geographic area include big game hunting, upland game hunting, waterfowl hunting, wildlife viewing, mountain biking, hiking, fishing, and camping

Interstate I-90 runs through the entire unit. Primary access to this geographic area is State Highway 240 and road FS7190 (Wall/Scenic Road) in the northwest portion and roads FS7198 (Quinn), FS7197 (Bigfoot), FS7123 (Ackerman Hill), FS7108 (Cottonwood), FS7113 (Bad River County Road), and State Highway 73 in the southeast portion.

Wall Southeast Geographic Area

The Wall Southeast Geographic Area includes approximately 94,300 acres of National Forest System lands in the southeastern and parts of the north central portions of the Wall Ranger District.

The climate of the Wall Southeast Geographic Area can be classified as semi-arid Continental. Local weather can be highly variable and unpredictable. Temperatures can range from minus 20 degrees below zero Fahrenheit in the winter to more than 100 degrees Fahrenheit in the summer. Precipitation levels average 16.5 inches per year with the majority falling as rain from about April to July.

The topography of the area consists of badlands features and flat clay hardpan with sparse vegetation, generally located below the "Wall" badlands landscape feature. The "Wall" is more than 40 miles in length, beginning near Wall, South Dakota, and tapering out south of Kadoka, South Dakota. This landscape feature drops vertically an average of about 600 feet. The major distinguishing landmarks and features include the "Wall," and the badlands overflow drainages, which are typically narrow and deep. Drainages flow primarily to the south and east into the White River, or the north and east into the Cheyenne River. Elevations range from approximately 2,200 feet above sea level along the White River to 2,600 feet above sea level at the top of the "Wall."

Upland grassland is the primary vegetation/habitat type covering about 81% of the geographic area. The soils are moderately productive in this geographic area, providing a range of forage production annually from 800 to 1,600 pounds per acre. Over 60 percent of the upland grassland habitat consists of highly productive range sites and nearly 25 percent consists of minimally productive range sites. Native vegetation is dominated by mid grasses and short grasses with a variety of forbs. This mixed grass prairie is made up of cool-season and warm-season plants that provide diverse habitat for a variety of wildlife species and forage for livestock. The principle grass species are western wheatgrass, green needlegrass, needleandthread, sideoats grama, blue grama, buffalograss, little bluestem, and big bluestem. The next largest vegetation/habitat type is badlands, which comprises about 13% of the geographic area. Badlands are barren,

highly eroded lands with little or no vegetation. Badlands provide unique habitat for some plants and animals that are suited to open, barren soils.

Prairie dog colonies (2%) are a unique component of the upland grasslands and provide habitat for a number of TES species. Prairie dog colonies are fairly small and scattered across this geographic area. The sagebrush habitat type (2%) is limited and found along several of the major floodplain areas scattered throughout this geographic area. This habitat type is dominated by silver sagebrush with a variety of interspersed grass species. Although the woody draw/riparian woodland habitat (1%) comprises a very small portion of the geographic area, it is critical for many wildlife species. The woody draw/riparian woodlands provide the highest diversity of both plant and animal life in the geographic area. Principle woody species include green ash, chokecherry, buffaloberry, snowberry, cottonwood, and willow. The primary creeks and drainages flowing toward White River include Fifteen Creek, Cut Creek, Rake Creek, and Sixteen Mile Creek. White River flows along the south boundary of this geographic area. Wetland/aquatic habitat is unusual in this geographic area (1%) Most are constructed water impoundments that provide significant benefits for waterfowl production. Ducks Unlimited, in partnership with the Forest Service, has constructed three wetland impoundments within this geographic area to improve habitat for waterfowl. Kadoka Lake is the second largest wetland specifically managed for waterfowl production in western South Dakota. A number of these impoundments have been developed into warm-water fisheries and provide additional recreational experiences.

Currently, the only developed recreational facility within this geographic area is the fourteen-mile long Prairie Bike Trail. The primary dispersed recreational opportunities within this geographic area include big game hunting, upland game hunting, waterfowl hunting, rockhounding, wildlife viewing, mountain biking, hiking, fishing, and camping.

Interstate I-90 runs along the northern portion of this unit. Primary access to this geographic area is FS7116 (Steer Pasture), FS7197 (Bigfoot), FS7107 (Chamberlain Pass), FS7106 (Old 40).

Wall Southwest Geographic Area

The Wall Southwest Geographic Area includes approximately 102,500 acres of National Forest System lands in the southwestern and south central portions of the Wall Ranger District.

The climate of the Wall Southeast Geographic Area can be classified as semi-arid Continental. Local weather can be highly variable and unpredictable. Temperatures can range from 20 degrees below zero Fahrenheit in the winter to more than 100 degrees Fahrenheit in the summer. Precipitation levels average 16.5 inches per year with the majority falling as rain from about April to July.

The topography of the area can be divided into two distinct areas. The flat-bottomed Conata Basin includes small inclusions of badlands features, and the "Wall," a steep

badlands escarpment that rises 800 feet to the north. The Indian Creek area consists of very steep juniper breaks with large intermingled badland formations, located toward the western portion of this geographic area. Major distinguishing features include the extensive prairie dog complex of Conata Basin and the rugged, fossil-rich badlands and juniper breaks of the Indian Creek country. Drainages flow primarily to the northwest into the Cheyenne River, or southeast toward White River. Elevations range from approximately 2,200 feet above sea level along White River to about 2,600 feet above sea level at the top of the "Wall."

Upland grassland is the primary vegetation/habitat type covering nearly 63% of the geographic area. The soils are moderately productive on this geographic area, providing a range of forage production annually from 1,000 to 1,800 pounds per acre. Nearly 60 percent of the upland grassland habitat consists of highly productive range sites and only 6 percent consists of minimally productive range sites. Native vegetation is dominated by mid grasses and short grasses with a variety of forbs. This mixed grass prairie is made up of cool-season and warm-season plants that provide diverse habitat for a variety of wildlife species and forage for livestock. Principle grass species are western wheatgrass, green needlegrass, needleandthread, sideoats grama, blue grama, buffalograss, little bluestem, and big bluestem. The next largest habitat type in the geographic area is badlands (22%). Badlands are barren, highly eroded lands with little or no vegetation. Badlands provide unique habitat for some plants and animals that are suited to open, barren soils.

This geographic area contains one of the largest complexes of prairie dog colonies on public lands and comprises nearly 9% of the geographic area. There are over 75 individual colonies varying in size from a few acres to over one thousand acres. The vegetation is dominated by a mixture of short grasses and forbs. Prairie dog colonies are a unique component of the upland grasslands and provide habitat for a number of TES species. Currently (2000), this geographic area hosts the world's most successful black-footed ferret reintroduction program. Over 140 adult ferrets, many of which were born in the wild, are repopulating the area's prairie dog colonies.

The balance of the geographic area is comprised of a variety of vegetation/habitat types, including the sagebrush habitat type (3%), which is found along several of the major floodplain areas scattered throughout this geographic area. This habitat type is dominated by silver sagebrush with a variety of interspersed grass species. Juniper breaks (1%) are a unique habitat type that occurs primarily along the Cheyenne River west of Scenic. This habitat type provides critical hiding cover and thermal cover for a number of wildlife species. The woody draw/riparian woodlands habitat type (1%) provides the highest diversity of both plant and animal life in the geographic area.

The primary creeks and drainages flowing northward toward the Cheyenne River include Spring Draw, Indian Creek, Little Corral Draw, Big Corral Draw, Nevis Draw and Bear Creek. The Cheyenne River also flows through this geographic area. Primary creeks and drainages flowing southward toward White River include Cain Creek and Big Hollow

Creek. Wetland/aquatic habitat is unusual in this geographic area (1%). Most are constructed water impoundments that significantly benefit waterfowl production. Currently, there are no developed recreational facilities within this geographic area. Motorized travel has been restricted in the Indian Creek area since 1984. The primary dispersed recreational opportunities within this geographic area include big game hunting, upland game hunting, waterfowl hunting, rockhounding, wildlife viewing, mountain biking, hiking, fishing, and camping.

Primary access to this geographic area is via State Highway 44. Access into this area is from road FS7180 (Scenic Basin) and FS7109 (Conata Basin).

Fort Pierre National Grassland

The Fort Pierre National Grassland encompasses 116,000 acres of National Forest System lands in central South Dakota beginning five miles south of Fort Pierre, SD and extending southward to within five miles of I-90. This grassland is contained in one geographic area: the Fort Pierre Geographic Area. The Fort Pierre National Grassland shares a common boundary with the Lower Brule Indian Reservation on six miles of its northeastern boundary, and lies within two miles of the Missouri River on its northeastern corner. All of the drainages on the Fort Pierre National Grassland eventually flow to the Missouri River. The Grassland adjoins no other National Forest System lands and is some 75 miles from the nearest National Forest System land on the Buffalo Gap National Grassland to the southwest. The Fort Pierre Ranger District's administrative office is located in Pierre, South Dakota.

Fort Pierre National Grassland

The Fort Pierre Geographic Area includes about 116,080 acres of National Forest System lands that are administered as Fort Pierre National Grassland. The office is in Pierre, South Dakota.

The area's climate is semi-arid Continental. Warm summers have frequent hot spells. Winters can be very cold, when arctic winds penetrate from the north. Average temperatures are 72 degrees Fahrenheit in summer and 19 degrees in winter. Average annual precipitation is about 18 inches, with most occurring between April and September. Blizzards and thunderstorms with hail occur seasonally.

The area is a gently rolling plain with few trees. Elevation ranges from about 1,550 to 2,238 feet above sea level. Drainages include Sand Creek, Timber Creek, Cedar Creek, Antelope Creek, Gray Blanket Creek, Stony Butte Creek, Porcupine Creek, and East Branch of War Creek. These intermittent streams flow mainly east and north to the Missouri River.

Upland mixed-grass prairie is the vegetation/habitat type over most of the national grassland. Western wheatgrass is the most prevalent grass species, growing on diverse sites. Green needlegrass and buffalograss also grow on the deep clays of ridge tops and flats. Side-oats grama, big bluestem, little bluestem, and blue grama grow on more shallow, sloping clays. Woody vegetation growing along drainages includes cottonwood,

wild plum, willow, and western snowberry. Much flat or gently sloping private land in the area has been plowed to produce wheat, sunflowers, sorghum, corn, or alfalfa hay. Prairie dog colonies occupy about 600 acres on the national grassland.

Over 150 ponds, ranging in size from less than an acre to over 20 acres, have been constructed in intermittent drainages. All provide waterfowl habitat. Some offer fishing for large-mouthed bass and panfish, such as bluegill, crappie or yellow perch. There are no developed recreation sites in this geographic area.

Primary access to this geographic area is via US Highway 83 that runs north and south through the unit. There are several access routes from US Highway 83 that include; road FS204 (Reservation Road), FS7211 (Stony Butte), FS221 (Chester), and FS209 (Draper).

Pine Ridge Ranger District, Nebraska National Forest

The Pine Ridge Ranger District office is located three miles south of Chadron, Nebraska. The district manages both the Pine Ridge portion of the Nebraska National Forest, as well as the Oglala National Grassland. The Pine Ridge area includes about 50,500 acres of National Forest System lands in northwestern Nebraska. The Oglala National Grassland encompasses about 94,000 acres of National Forest System lands in Nebraska's northwest corner. The district is divided into two geographic areas:

Oglala National Grassland Geographic Area

The Oglala Geographic Area encompasses 94,174 acres of National Forest System lands in northwestern Nebraska. The Pine Ridge Ranger District of the Nebraska National Forest administers the Oglala Geographic Area. The district office is located south of Chadron, Nebraska. Wyoming borders this area on the west and South Dakota on the north.

The climate of the Oglala Geographic Area can be classified as semi-arid Continental. Warm summers, cold winters, light precipitation, and frequent changes in the weather characterize the climate. Temperature extremes, as recorded at Fort Robinson (near Crawford, Nebraska), range from minus 37 degrees Fahrenheit to 110 degrees Fahrenheit. About 80 percent of precipitation falls between April and September. The average annual precipitation ranges from about 15 inches at Ardmore, South Dakota, located just north of this geographic area, to about 18 inches near Crawford just south of the geographic area. Blizzards generally occur several times each winter, while hail can accompany thunderstorms in the summer.

The topography of the area is a blend of rolling plains and badlands, including highly eroded benches, clay hardpan and bluffs. The major distinguishing landmarks include Toadstool Geologic Park, Roundtop, Wolf Butte and agate beds in the Sugarloaf Butte area.

Drainages flow primarily to the south and east on the southern portions of the geographic area and to the north and east on the northern portions of the geographic area. Elevations range from about 3,600 feet above sea level near Rock Bass Reservoir to about 4,700 feet

above sea level at Eagle Eye Rock, about two miles south of Hudson-Meng Bison Bonebed. The White River System drains the southern portions of this geographic area, while the Cheyenne River System drains the northern portions. Primary tributaries in the southern portions of the geographic area include Little Cottonwood, Big Cottonwood and Sand Creeks. Primary tributaries in the northern portions include Whitehead, Antelope, Indian, Hat and Squaw Creeks.

The upland grassland is the primary vegetation/habitat type of the geographic area. Mid grasses dominate the native vegetation, but include short grasses and a variety of forbs. This mixed grass prairie is made up of cool-season and warm-season plants that provide diverse habitat for a variety of wildlife species and forage for livestock. The principle vegetative species are western wheatgrass, green needlegrass, buffalograss, blue grama, sideoats grama, and western snowberry. Other important habitat vegetation includes cottonwood, green ash, boxelder, silver buffaloberry, willow, and silver sage.

Badlands provide a unique habitat for some plants and animals that are suited to open, barren soils. Prairie dog colonies are a unique component of the upland grasslands and provide habitat for a number of TES species. Prairie dog colonies are fairly small and scattered across this geographic area. Although the woody draw/riparian woodland habitat comprises a small portion of the geographic area, this habitat type is critical for many wildlife species. The woody draw/riparian woodlands provide the highest diversity of both plant and animal life in the geographic area. Principle woody species include cottonwood, green ash, boxelder, silver buffaloberry, snowberry, willow and wildrose. The Roundtop area of the Oglala Geographic Area consists of a ponderosa pine/grassland mix typical of the Pine Ridge Geographic area. The primary creeks and drainages include Sand Creek, Longbranch, Whitehead, Hat Creek, Antelope Creek, Indian and Brush Creeks. Wetland/aquatic habitat is unusual in this geographic area and much of it is located near constructed water impoundments that provide waterfowl habitat and support warm-water fisheries. The sagebrush habitat type is very limited and found along several of the major floodplain areas scattered across this geographic area.

Two developed recreational facilities existing in the Oglala Geographic Area are Hudson-Meng Bison Bonebed and Toadstool Geological Park. The primary dispersed recreational opportunities within this geographic area include big game hunting, limited upland game and waterfowl hunting, wildlife viewing, mountain biking, hiking, fishing, camping, and rock hounding.

Primary access to this geographic area is via State Highway 71 on the east side and FS915 (Harrison Road) on the west side. Access into this unit from State Highway 71 include; road FS904 (Old Highway 2) and FS900 (Sugarloaf). Major routes that go through this unit are roads FS905 (Sand Creek), FS907 (Montrose), FS918 (Cedar Canyon), FS914 (Hat Creek), and FS916 (Antelope Creek).

Pine Ridge Unit Geographic Area

The Pine Ridge Geographic Area encompasses about 50,529 acres of National Forest System lands in northwestern Nebraska. The Pine Ridge Ranger District of the Nebraska National Forest manages this geographic area. The district office is located south of Chadron, Nebraska.

The climate of the Pine Ridge Geographic Area can be classified as semi-arid Continental. Warm summers, cold winters, light precipitation, and frequent changes in the weather characterize the climate. Temperature extremes, as recorded near Crawford, Nebraska, range from minus 37-degrees Fahrenheit to 110-degrees Fahrenheit. About 80 percent of precipitation falls between April and September, with annual averages in the 18-inch range.

The topography of the area is dominated by the Pine Ridge, an escarpment of sandstone bluffs that extends just beyond the border in Wyoming, through northwestern Nebraska, then into southwestern South Dakota. The Pine Ridge is characterized by extensive growth of ponderosa pine, with some small inclusions of quaking aspen. Major landmarks and significant areas along the Pine Ridge, west to east, include the Soldier Creek Wilderness, the Pine Ridge National Recreation Area, Coffee Grinder Butte, and Aristocrat Butte. Elevations range between about 3,440 feet above sea level at Bordeaux Creek to 4,600 feet above sea level in the Deadman Creek area.

Drainages flow mainly toward the north (except for South, Middle, and North Forks of Soldier Creek, which flow to the southeast) into the White River and include, west to east, Deadman Creek, Cherry Creek, White Clay Creek, Saw Log Creek, West Ash Creek, East Ash Creek, Indian Creek, Cunningham Creek, Dead Horse Creek, Chadron Creek and Bordeaux Creek.

Vegetation consists of a grass/forest mix dominated by ponderosa pine, cool-season and warm-season grasses, and a variety of forbs. This vegetative mix provides a diverse habitat for a variety of wildlife species and forage for livestock. Principle deciduous tree species are cottonwood, hackberry, boxelder and green ash. Other woody species that can be found locally abundant are snowberry, chokecherry and wild plum. Grass species include western wheatgrass, little bluestem, big bluestem, prairie sandreed, buffalograss and green needlegrass. Sedges include threadleaf and needleleaf sedges.

The geographic area is comprised of a variety of vegetation/habitat types; coniferous forests are dominated by ponderosa pine. Areas of open coniferous forest/grassland (savannah) also make-up this geographic area. Open grassland (parkland) areas are frequently found throughout the forested area. These vegetative mixes provide important loafing, hiding, escape and thermal cover for many wildlife species. The woody draw and riparian woodland habitats comprises a small portion of the geographic area but are considered critical for many wildlife species. The primary creeks and drainages include Bordeaux, Chadron, Dead Horse, Indian, Cunningham, East Ash and West Ash. Soldier Creek Wilderness includes the North, Middle, and South Forks of Soldier Creek. The

wetland/aquatic habitat provides a cold-water brown and brook trout recreational fishery. The geographic area has several developed recreational facilities including Spotted Tail, Outrider, Roberts and Soldier Creek Trailheads. Numerous hiking, horseback riding and mountain bike trails exist across the geographic area. The primary dispersed recreational opportunities within this area include big game hunting, wildlife viewing, horseback riding, mountain biking, hiking, fishing and camping.

Primary access to this geographic area is off of State Highway 71, US Highway 385 and US Highway 20 that also includes access via FS800 to the Soldier Creek Wilderness Area. Access from State Highway 71 is FS707 (Squaw Creek). Access to the unit from US Highway 20 include; roads FS704 (West Ash), FS706 (East Ash), FS713 (Dead Horse), and FS703 (Bordeaux). Access from US Highway 385 is FS705E and FS705W (Table Road). The major routes through this unit are roads FS718 (Highline) and FS719 (Strong Canyon).

D. Assessing benefits, problems and risks

Roads were evaluated based on a set of elements that were developed from issues. These elements were grouped and criteria developed to rate each road. A further grouping of similar elements was established to form the modules of Human Use, Aquatics, and Wildlife. Each road was given a rating for each module to aid in the determination of options for management.

Human Use

The objective of the human use portion of the roads analysis is to identify the level of importance the road system is to the human use activities in the particular geographic areas and to further identify the primary activities or combination of activities the road system is used for. Social values vary greatly among users. Further, users with similar interests will have differing perceptions of what constitutes appropriate access. It is not possible to satisfy every individual or group of individuals, nor is it possible to identify what people will desire tomorrow or into the next decade. It is possible to observe trends and at least make some qualitative estimates of what the future needs may be. However, we generally lack sufficient data to make categories of human use that exist today on a broad scale, but will not attempt to make quantitative predictions of future needs.

The human use factors are grouped into broad categories relating to the amount of flexibility the decision maker has, whether the value is expected to be of local, regional or national scale, the current use pattern, and desired future conditions. The rating criteria are described in detail in Appendix A. In this analysis, roads with scores of 9 and above were given high value, 6 through 8 moderate value, and 5 or below a low value.

The general feeling, based on comments received during the Northern Great Plains Management Plans Revision process is that people want to see access maintained. They also want to see access for a variety of activities. Comments suggest that maintenance

levels can be adjusted as long as access is not eliminated. The common opinion is that continued access should be maintained.

The elements and criteria to rate these roads were as follows:

Criteria Number 1: REQUIRED BY LAW, AGREEMENTS, AND PERMITS

Elements Addressed

- Legal basis (GT 1-3)
- Special Use Permits (SU 1)
- Water Production (WP 1)

Rating:

1. Identify areas where allocations involve Public Laws such as ANILCA, RS 2477 or where treaty requirements apply
2. Identify areas that have active permits, easements, or binding agreements
3. Identify areas that have special use permits involved
4. Relative rankings are based on the following:
 - a. **High (10)** public law requires road access to be provided
 - b. **Medium (7)** agreements or permits exist, but there are alternatives or options available to meet identified needs.
 - c. **Low (3)** there are short-term commitments, which will expire or can be replaced with suitable alternatives.

Criteria Number 2: RESOURCE MANAGEMENT

Elements Addressed

- Ecosystem Function and Process (EF 1-4)
- Administrative Use Needs (AU 1)
- Value of road for Forest Service and cooperators to suppress wild land fires, fuels management and public safety (PT 1-4)
- Value of road for management of suitable timber base and silvicultural treatment (TM 2-3)
- Value of road for access to locatable, leasable and salable minerals (MM 1)
- Value of road for access to range allotments (RM 1)

Rating:

1. Identify project areas and land allocations where access is necessary to protect forest and grassland resources, facilities, or property.
2. Identify locations of management strategies needing road access.
3. Identify levels of access necessary to meet these strategies.
4. Review the research, monitoring, or inventory requirements of land management plans.
5. Relative rankings are based on the following:
 - a. **High (10)** life or properties are at risk or the history of severe resource damage occurring in this area.
 - b. **Medium (7)** access is necessary for resource protection for long term.
 - c. **Low (3)** access is needed for implementation of management strategies for the near future.

Criteria Number 3: PUBLIC ACCESS AND LEVEL OF USE

Elements Addressed:

- Unique cultural or spiritual value (PV 2-3)
- Unique physical or biological value (PV 1 and 4)
- Peoples perceived values and needs for the road (SI 1-2)
- Access and affect of road on paleontological, archeological, and historic sites (SI 3-4 and 9)
- Value to local community social and economic health (SI 6 and 7)
- Consistency with Recreation Opportunity Spectrum classification (SI 8)
- Unroaded recreation values (UR&RR 1,2, 4-6)
- Effect access to collect special forest products (SP 1)
- Address safety of road users (GT 4)
- Effect certain user groups (CR 1)

Rating:

1. Categorize emphasis or major use areas such as ORV, horse use areas, motorized winter sports, non-motorized winter sports, hiker only, and other established use patterns popular for recreation uses.
2. Identify the predominant ROS classifications by geographic level
3. Identify roads or segments by stakeholders that have expressed interest for certain types of use.
4. Relative rankings are based on the following:
 - a. **High (10)** road is needed to accesses developed facilities and activities toward the developed end of the ROS scale.
 - b. **Medium (7)** activities are semi-primitive motorized or semi-primitive non-motorized portion of scale. Low standard roads are preferred and/or low density is preferred to enhance the recreation activity.
 - c. **Low (3)** semi-primitive non-motorized or primitive ROS classification. Activities are characterized being more challenging and more secluded. The degree of skill needed is greater.

Criteria Number 4: ECONOMICS

Elements Addressed:

- Effect to direct costs and revenues (EC 1)
- Effect to economic efficiency and distribution of benefits (EC 1 and 2)

Ratings:

1. Identify areas that are allocated for have become established for developed sites, fee sites, concession, or commercial permit operations, and are necessary to directly support these services.
2. Identify areas that are important for activities that provide revenue to local communities and businesses.
3. Relative rankings are based on the following:

- a. **High (10)** access is essential for commodity production or area business. Road would be left open for obvious reasons. These would be roads connecting communities, access to recreation areas, etc.
- b. **Medium (7)** tourism or local businesses benefit indirectly; other access points or forms of access could replace this road and businesses would not be severely effected. Road access is desirable to draw users into the communities.
- c. **Low (3)** economic dependency on access is ether low or short term.

Aquatics

Roads were placed into either high, medium or low risk based upon the analysis completed in Appendix B. The risks were determined based upon the aquatic score for the road. High-risk roads generally are located adjacent to streams for an at risk species. These roads are usually delivering sediment to the streams, on unstable lands, or confining the flood plain. Passage barriers to some life stage of an at-risk species were often present. High-risk roads scored 9 or above. Medium risk roads have some erosion problems or were contributing to riparian degradation. Medium risk roads scored between 6 and 8. Low risk roads scored under 5 and were low risk because it was felt potential direct delivery of sediment and adverse impacts to at risk species was low due to location and current condition of the roads.

The elements and criteria to rate these roads were as follows:

Criteria Number 1: HYDROLOGY

Elements addressed

- Effects to surface and subsurface hydrology (AQ 1)

Ratings:

1. Relative rankings are based on the following:
 - a. **High (10)** road frequently intercepts both surface runoff and/or groundwater in sufficient volumes to influence flow downstream and delivering waters directly to streams. Landform slopes are steep and drainage densities high, providing increased delivery efficiency to stream channels. Downstream channels are unstable and susceptible to damage from increased peak flows. Road prisms may be interrupting an detaining water preventing it from recharging floodplain aquifers. Road has high hydrologic connectivity to the stream system.
 - b. **Medium (7)** road is occasionally intercepting runoff, esp. during peak events, but generally not groundwater. Delivery efficiencies are low due to combination of landform slope and weakly developed stream networks. Some additional ditch relief is necessary for routing surface runoff through vegetative filter. Downstream reaches may be susceptible to damage from increased peak flows.

- c. **Low (3)** road is not intercepting concentrated runoff or groundwater in ditch lines. Runoff is cross-drained through vegetative filter prior to reaching stream channels. Natural paths are maintained uninterrupted.

Criteria Number 2: EROSION

Elements Addressed:

- Generated surface erosion (AQ 2)
- Stream crossing influence on local stream channels and water quality (AQ 4)

Ratings:

1. Relative rankings are based on the following:
 - a. **High (10)** road surface and/or fill slopes exhibit either erosion into streams, visible ditch erosion, or cut slope erosion into ditches. Sediment directly enters stream from ditch, fill slopes begin to fail, and evidence of accelerated mass wasting due to the sediment becomes prevalent. Crossings with high potential for failure where failure of the prism will result in a large amount of sediment into stream or the culvert is over-topped and is highly likely the stream will travel down the road and deliver sediment into stream, crossings are altering stream channel type downstream and/or causing downstream bank erosion.
 - b. **Medium (7)** road is native surfaced or graveled but no visible erosion, ditch relief culverts are not causing erosion of fill into streams, crossing are perpendicular to the stream and sufficient to pass the 100 year flood, or designed so that if they do fail only the prism at the crossing fails. Crossings are not impacting channel morphology downstream or causing downstream bank erosion.
 - c. **Low (3)** road is a hard surfaced, crossings are bridged or sufficient to pass the 100-year flood and associated debris. Cut and fill slopes are vegetated and not eroding. Crossings are not impacting channel morphology downstream.

Criteria Number 3: BENEFICIAL USES

Elements Addressed:

- Downstream beneficial uses of water and demands (AQ 7)

Ratings:

1. Relative rankings are based on the following:
 - a. **High (10)** road is with an area listed on State 303 (d) list or 305 (b) report and has the potential to contribute to the listing.
 - b. **Low (3)** road is not within an area listed on State 303 (d) list or 305 (b) report.

Criteria Number 4: AT RISK POPULATIONS

Elements Addressed:

- Effects to fishing, poaching and direct habitat loss for at risk aquatic species (AQ 12)

- Effects to areas of exceptionally high aquatic diversity or rare species (AQ 14)

Ratings:

1. Relative rankings are based on the following:
 - a. **High (10)** road is in a watershed that contains at risk species. The road is or has potential, to have serious adverse impacts to at risk species habitat; and/or there are road crossing barriers to some life stage of at risk species; and/or there is known poaching of at risk species occurring.
 - b. **Medium (6)** road is in a watershed that contains at risk species. The road is or has the potential to have serious adverse impacts to at risk species habitat; there is no road crossing barriers to some life stage of at risk species; there is no known poaching of at risk species occurring.
 - c. **Low (3)** no known at risk species occur in the watershed

Wildlife

High-risk roads usually offered the greatest potential for improving habitat and identified risks associated with high road densities. High-risk roads scored greater than 9 points.

Moderate risk roads would usually have one element of strong potential, often improving habitat or high road density. Moderate risk roads scored 6 to 8 points.

Low risk roads were often characterized to be either not in conflict with current habitat conditions, limited restoration opportunities due to current road conditions, or low road density conditions. These roads scored 5 points or less.

The elements and criteria to rate these roads were as follows:

Criteria Number 1: TERRESTRIAL WILDLIFE

Elements Addressed:

- Direct effects on terrestrial species habitat (TW 1)

Ratings:

1. Amount and location of wildlife habitat areas.
2. Road density within geographic areas.
3. Proportion of geographic area affected by roads in relationship to wildlife areas.
4. Relative rankings are based on the following:
 - a. **High (10)** the area has high potential to enhance habitat effectiveness, improve security habitat, and potential to improve habitat conditions for target species.

- b. **Medium (6)** the area has moderate potential to enhance habitat effectiveness, improve security habitat, and potential to improve habitat conditions for target species.
- c. **Low (3)** the area has low potential to enhance habitat effectiveness, improve security habitat, and potential to improve habitat conditions for target species.

Criteria Number 2: HUMAN ACTIVITY

Elements Addressed:

- Affects to habitat by facilitating human activities (TW 2)
- Affect to legal and illegal human activities, i.e., trapping, hunting, poaching (TW 3)

Ratings:

1. Identify areas of recreational impact on uses for hunting, fishing and hiking.
2. Identify impacts of timber management activities and fuel wood collection.
3. Identify impacts of road density and public use patterns.
4. Relative rankings are based on the following:
 - a. **High (10)** high potential to improve the security habitat and habitat effectiveness.
 - b. **Medium (6)** moderate potential to improve the security habitat and habitat effectiveness.
 - c. **Low (3)** low potential to improve the security habitat and habitat effectiveness.

Criteria Number 3: UNIQUE SPECIES

Questions Addressed:

- Effects of unique communities or special features (TW 4)

Ratings:

1. Effects of roads on unique habitats within each geographic area
2. Effect of road density in relationship to riparian areas
3. Impacts of roads on wetlands
4. Relative rankings are based on the following:
 - a. **High (10)** relationship of unique habitats to road density is high, road crosses or is adjacent to wetland or wet meadow.
 - b. **Medium (6)** relationship of unique habitats to road density is moderate and road is adjacent to wetland or wet meadow.
 - c. **Low (3)** relationship of unique habitats to road density is low and road does not cross or is adjacent to wetland or wet meadow.

E. Describing opportunities and setting priorities

Recommended Management Actions, describing opportunities and setting priorities are a group of alternatives that are possibly options to meet the needs of the resources and the public. Any single action or combination of actions could be used. This analysis will

give the broad category and the units will need to decide which actions are appropriate for each project.

The range of recommended actions or strategies fit into 6 general categories as described below:

- A. Access needs to be maintained due to public needs, however some major work or restrictions are needed to mitigate the resource impacts.
- B. Access need to be maintained due to public needs, however, some minor work or restrictions are needed to mitigate the resource impacts.
- C. Due to limited access needed and minimal resource impacts, these are candidates to leave as is, maintenance continues as is.
- D. Access needs to be maintained but due to limited public or resource needs and that there is few or no resource impacts, it would be possible to reduce the maintenance level
- E. Access may be available but due to minimal resource impacts, these are potential candidates to stop maintaining and putting in a maintain when needed basis.
- F. Access does not need to be maintained and some form of decommissioning to provide ecosystem restoration would mitigate resource impacts.

Each road was rated for each module (Human Use, Aquatic, and Wildlife). All possible combinations of ratings are displayed below and a recommended action assigned by the Roads Analysis Core and Extended Team. These are displayed in Appendix D.

Human Use Rating	Aquatic Rating	Wildlife Rating	Recommended Action
H	H	H	A
H	H	M	A
H	H	L	A
H	M	H	A
H	M	M	A
H	M	L	A, B
H	L	H	A
H	L	M	A, B
H	L	L	B
M	H	H	A
M	H	M	A
M	H	L	A
M	M	H	A
M	M	M	B
M	M	L	B, C, D
M	L	H	A

M	L	M	B, C, D
M	L	L	B, C, D
L	H	H	F
L	H	M	F
L	H	L	F
L	M	H	F
L	M	M	C, D, E, F
L	M	L	C, D, E, F
L	L	H	F
L	L	M	C, D, E, F
L	L	L	E, F

F. Reporting

NEPA analysis needs

This forest scale roads analysis is intended to be used as an assessment to aid in project level planning and in the development of travel management at a District scale. This roads analysis does not need any NEPA analysis as it provides information and opportunities for sub-forest and grassland scale roads analyses. Any sub-forest or grassland scale roads analyses will be required to be supported by the appropriate level of NEPA.

The results of this analysis are shown in Appendix D that displays the value and risk ratings for each road. Also displayed in Appendix D are the recommended management actions for each road. The other Appendices display supporting information in the development of Appendix D.